

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in this application. This amendment combines the previous amendments and presents the claims in the above application in one document. The claims listed below do not present any additional amendments to the claims. The first amendment to claim 42 was made in the Amendment filed February 19, 2002; the second amendment to claim 42, and the amendments to claims 35 and 49 were made in the Amendment filed October 14, 2002.

Listing of the claims:

1. An elongated spacer stock used in the manufacture of a spacer frame to separate sheets of an insulating unit, the spacer stock comprising:

an elongated base;

a first elongated leg having a first member and a second member joined together to have a generally U-shaped cross section;

a second elongated leg having a first member and a second member joined together to have a generally U-shaped cross section; wherein

the first and second legs are spaced from and out of contact with one another and joined to the base to provide a generally U-shaped cross section with open end of the U formed by the first and second legs and base in a first direction, the U shape of the first leg open in a second direction, and the U-shape of second leg open in the second direction with the first and second directions opposite to one another, and the first and second legs spaced from and out of contact with one another.

2. The spacer stock of claim 1 wherein the first member of the first and second legs is joined to the second member of the first and second legs by a radiused portion.

3. The spacer stock of claim 2 wherein the first and second members of the first and second legs are spaced from one another.

4. The spacer stock of claim 3 wherein the end of the second member of the first and second legs is radiused.

5. The spacer stock of claim 4 wherein the radiused end of the second member of the first and second legs contacts surface of the base between the first and second legs.

6. The spacer stock of claim 4 wherein the radiused end of the second member of the first and second member are spaced from the surface of the base between the first and second legs.

7. The spacer stock of claim 1 wherein the first and second members of each of the first and second legs are in contact with one another.

8. An elongated spacer stock used in the manufacture of a spacer frame to separate sheets of an insulating unit, the spacer stock comprising:

a base;

a first leg connected to the base; and

a second leg connected to the base and spaced from the first leg, wherein the legs and the base are connected to provide a generally U-shaped cross-section, wherein the first and second legs have a thickness greater than the thickness of the base to reduce torsional twist of the spacer stock.

9. The spacer stock of claim 1 wherein the spacer stock has a continuous base and portions of the second member are removed at positions along the spacer stock that form corners when the spacer stock is bent into a spacer frame.

10. The spacer stock of claim 9 wherein the first member at corners has weakening lines arranged to have a generally "V" shape.

11. The spacer stock of claim 9 wherein the first member has a cut out portion at the positions along the spacer stock that form corners when the spacer stock is bent into a spacer frame.

12. The spacer stock of claim 1 wherein the base has a "T" shaped cross section extending upwardly between the first and second legs, and is spaced from and out of contact with the first and second legs.

13. A spacer frame for separating sheets of an insulating unit, the spacer frame comprising:

a base;

a first leg connected to the base, the first leg having a first member and a second member joined together to have a generally U-shaped cross section;

a second leg connected to the base, the second leg having a first member and a second member joined together to have a generally U-shaped cross section; wherein

the first and second legs are spaced from and out of contact with one another and connected to the base to provide the spacer frame with a generally U-shaped cross section with open end facing in a first direction and opening of U of the first and second legs facing in a second direction opposite to the first direction to reduce torsional twist.

14. The spacer stock of claim 13 wherein the first member is joined to the second member by a radiused portion.

15. The spacer stock of claim 14 wherein the first and second legs each include:

a first member joined to a second member to have a generally hairpin configuration with the first member joined to the base.

16. The spacer stock of claim 15 wherein:

the end of the second member is radiused, and

the radiused end of the second member is out of contact with the base.

17. The spacer frame of claim 13 wherein the spacer frame has corners and the base is continuous around the corners of the spacer frame.

18. The spacer frame of claim 17 wherein the portions of the outer legs are bent toward one another over the base.

19. The spacer frame of claim 18 wherein portions of the second member are removed at the corners and portions of the first member are bent over the base.

20. The spacer frame of claim 16 wherein a bead of moisture pervious material having a desiccant is deposited

on the surface of the base between the first and second legs defined as inner surface of the base, and the bead having portions between the radiused end of the second member of the first and second legs and the inner surface of the base.

21. An insulating unit comprising:

a pair of sheets;

a spacer frame between the pair of sheets, and the spacer frame comprising:

a base;

a first leg

a second leg; wherein

the first and second legs are spaced from and out of contact with one another and joined to the base to provide the spacer frame in cross section with a generally U-shaped cross section with the open end of the U facing a first direction and the first and second legs each including a first U-shaped member having two ends, one end attached to the base and the remaining end joined by a radiused portion to the second member such that the members form a generally U-shaped cross-sectional configuration with the opening of the U facing a second direction opposite to the first direction to reduce torsional twist, and

means for securing the sheets to the spacer frame.

22. The insulating unit of claim 21 wherein the securing means include a moisture impervious sealant securing the sheets to the first and second legs of spacer frame.

23. The insulating unit of claim 20 further including a bead of a moisture pervious material having a desiccant mounted on surface of the base between the first and second legs.

24. The insulating unit of claim 21 wherein the first and second legs each include:

a first member joined to a second member to have a generally hairpin configuration with the first member joined to the base and the second member having an end positioned relative to the base.

25. The insulating unit of claim 24 wherein the first member is joined to the second member by a radiused portion.

26. The insulating unit of claim 25 wherein:

the first and second members are spaced from one another to provide the first and second legs with a hairpin cross sectional configuration;

the end of the second member is radiused, and the radiused end is spaced from and out of contact with the base.

27. The insulating unit of claim 26 wherein the spacer frame has corners and the base is continuous around the corners.

28. The insulating unit of claim 23 wherein the bead is between the ends of the second member and the inner surface of the base.

29. The insulating unit of claim 28 wherein the bead is a moisture pervious adhesive.

30. The insulating unit of claim 29 wherein the unit has a low thermal conducting edge.

31. The insulating unit of claim 29 further including a sheet mounted between the legs within the frame.

32. A method of making and using a spacer stock comprising the steps of:

providing a strip of bendable material and shaping the strip to provide an elongated piece of spacer stock having a base, a first leg and a second leg, the base and legs joined to provide the spacer stock with a generally U-shaped cross section with the U open in a first direction and the first and second legs spaced from one another and out of contact with one another, and the legs each having a first member joined to a second member to have a U-shaped cross section with the opening of the U in a second direction opposite to the first direction to reduce torsional twist of the spacer stock.

33. The method set forth in claim 32 further including the steps of:

identifying corner positions on the elongated piece of spacer stock;
removing portions of the second member at the corner positions, and
bending the spacer stock at the corner positions to provide a spacer frame.

34. The method as set forth in claim 33 further including the step of:

securing a sheet to outer surface of each of the legs to provide an insulating unit.

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35. (Amended) An elongated spacer stock used in the manufacture of a spacer frame to space sheets of an insulating unit, the spacer stock comprising:

an elongated base having a supporting surface;

an elongated first leg having a first elongated member joined to the elongated base and a second elongated member joined to the first elongated member of the first leg and having an end portion positioned over the supporting surface of the base;

an elongated second leg having a first member joined to the elongated base and a second elongated member joined to the first elongated member of the second leg and having an end portion positioned over the supporting surface of the base, the first member of the first leg and the first member of the second leg and the base joined together to have a U-shaped cross section;
and

a bead on the supporting surface of the base with portions of the bead between the supporting surface of the base and the end portion of the second elongated members of the first and second legs.

36. The spacer stock of claim 35 wherein the end portions of at least one of the second members of the first or second legs limits movement of the bead away from the supporting surface of the base.

37. The spacer stock of claim 36 wherein the bead is made of a moisture pervious material.

38. The spacer stock of claim 37 wherein the bead has desiccant therein.

39. The spacer stock of claim 37 wherein the moisture pervious material is a moisture pervious adhesive.

40. The spacer stock of claim 35 wherein the spacer stock has a length sufficient to provide a closed spacer frame for the insulating unit.

41. The spacer stock of claim 40 wherein the spacer stock has a first end and an opposite end defined as a second end and the first and second ends are to be joined to provide the closed spacer frame wherein the base is continuous from the first end to the opposite end.

42. (Twice Amended) A spacer frame to space sheets of an insulating unit comprising:

an elongated base having a supporting surface;

an elongated first leg having a first elongated member joined to the elongated base and a second elongated member joined to the first elongated member of the first leg and having an end portion positioned over the supporting surface of the base;

an elongated second leg having a first elongated member joined to the elongated base and a second elongated member joined to the first elongated member of the second leg and having an end portion positioned over the supporting surface of the base, the first elongated member of the first leg and the first elongated member of the second leg and the base joined together to have a U-shaped cross section; and

a bead on the supporting surface of the base with portions of the bead between the supporting surface of the base and the end portion of the second elongated members of the first and second legs.

43. The spacer stock of claim 35 wherein the end portions of at least one of the second members of the first or second legs limits movement of the bead away from the supporting surface of the base.

44. The spacer stock of claim 36 wherein the bead is made of a moisture pervious material.

45. The spacer stock of claim 37 wherein the bead has desiccant therein.

46. The spacer stock of claim 37 wherein the moisture pervious material is a moisture pervious adhesive.

47. The spacer stock of claim 35 wherein the spacer stock has a length sufficient to provide a closed spacer frame for the insulating unit.

48. The spacer stock of claim 40 wherein the spacer stock has a first end and an opposite end defined as a second end and the first and second ends are to be joined to provide the closed spacer frame wherein the base is continuous from the first end to the opposite end.

49. (Amended) An insulating unit comprising:
a pair of sheets;
a spacer frame between and adhered to the pair of sheets
by an adhesive, the spacer frame comprising:
an elongated base having a supporting surface;
an elongated first leg having a first elongated member
joined to the elongated base and a second elongated member
joined to the first elongated member of the first leg and having an
end portion positioned over the supporting surface of the base;
an elongated second leg having a first elongated member
joined to the elongated base and a second elongated member
joined to the first elongated member of the second leg and having
an end portion positioned over the supporting surface of the base,
the first elongated member of the first leg and the first elongated
member of the second leg and the base joined together to have a
U-shaped cross section; and
a bead on the supporting surface of the base with portions
of the bead on the supporting surface of the base and the end
portion of the second elongated members of the first and second
legs.

50. The spacer stock of claim 35 wherein the end portions of at least one of the second members of the first or second legs limits movement of the bead away from the supporting surface of the base.

51. The spacer stock of claim 36 wherein the bead is made of a moisture pervious material.

52. The spacer stock of claim 37 wherein the bead has desiccant therein.

53. The spacer stock of claim 37 wherein the moisture pervious material is a moisture pervious adhesive.

54. The spacer stock of claim 35 wherein the spacer stock has a length sufficient to provide a closed spacer frame for the insulating unit.

55. The spacer stock of claim 40 wherein the spacer stock has a first end and an opposite end defined as a second end and the first and second ends are to be joined to provide the closed spacer frame wherein the base is continuous from the first end to the opposite end.